

AMENDMENTS TO THE CLAIMS:**CLAIMS.**

We claim:

1. (Currently Amended) A hot melt adhesive composition consisting essentially of:

A) from about 40 to 100 percent by weight (based on the final weight of the hot melt adhesive composition) of a homogeneous ethylene/ α -olefin interpolymers wherein:

1) the homogeneous ethylene/ α -olefin interpolymers is present in an amount of from about 60 to about 85 percent by weight (based on the final weight of the hot melt adhesive composition) and the homogeneous ethylene/ α -olefin interpolymers is characterized by having::

i) a density of from about 0.880 to about 0.930 g/cm³;

ii) a number average molecular weight (Mn) of from about 1,000 to about

9,000; and

iii) a Brookfield Viscosity (measured at 300°F) of from about 500 to about 7,000 cP and

2) the hot melt adhesive composition is characterized by having:

i) a Brookfield Viscosity (measured at 350°F) of from about 400 to about

2,000 cP;

ii) a Peel Adhesion Failure Temperature ("PAFT") of greater than or equal to 110°F; and

iii) a Shear Adhesion Failure Temperature ("SAFT") of greater than or equal to 140°F; and

B) from about 0 to about 60 percent by weight (based on the final weight of the hot melt adhesive composition) of one or more tackifiers[.], wherein the homogeneous ethylene/ α -olefin interpolymers is produced by a process comprising the steps of:

contacting one or more olefinic monomers in a reactor in the presence of at least

U.S. S.N. 10/666,648

Page 9 of 28

0 two catalysts, one having a reactivity ratio r_1^H and the other a reactivity ratio r_1^L ,
 and
 effectuating the polymerization of the olefinic monomers in the reactor to obtain
 an olefin polymer, wherein
 each of r_1^H and r_1^L is from 1 to 200, and the ratio of r_1^H to r_1^L is from 0.03 to 30,
5 and/or
 one catalyst is capable of producing a first polymer with a high molecular weight
 (M_{wH}) from the monomers under selected polymerization conditions, and the
 other catalyst is capable of producing a second polymer with, relative to the first
 polymer, a low molecular weight (M_{wL}) from the same monomer under
10 substantially the same polymerization conditions, where the ratio of M_{wH} to M_{wL}
 is from 1 to 20.

2. (Cancelled).

15 3. (Previously Presented) The hot melt adhesive composition of Claim 1 wherein;

 A) the homogeneous ethylene/ α -olefin interpolmer is present in an amount of
 from about 65 to about 80 percent by weight (based on the final weight of the hot melt adhesive
 composition) and the homogeneous ethylene/ α -olefin interpolmer is characterized by having:

 I) a density of from about 0.890 to about 0.920 g/cm³;

20 ii) a number average molecular weight (M_n) of from about 1,250 to about

7,000; and

 iii) a Brookfield Viscosity (measured at 300°F) of from about 1,000 to
 about 6,000 cP; and

25 B) the one or more tackifiers is present in an amount of from about 20 to about 35
 percent by weight (based on the final weight of the hot melt adhesive
 composition); and where

 C) the hot melt adhesive composition is characterized by:

 I) having a Brookfield Viscosity (measured at 350°F) of from about 500

- 0 to about 1,400 cP;
ii) having a Peel Adhesion Failure Temperature ("PAFT") of greater than
or equal to 115°F;
iii) having a Shear Adhesion Failure Temperature ("SAFT") of greater
than or equal to 150°F; and
5 iv) exhibiting 100% paper tear at 35°F.- 140°F.

4. (Previously Presented) The hot melt adhesive composition of Claim 1 wherein;

A) the homogeneous ethylene/ α -olefin interpolmer is characterized by having:

- 10 i) a density of from about 0.895 to about 0.915 g/cm³;
ii) a number average molecular weight (Mn) of from about 1,500 to about
6,000; and
iii) a Brookfield Viscosity (measured at 300°F) of from about 1,500 to
about 5,000 cP; and

B) the hot melt adhesive composition is characterized by:

- 15 i) having a Brookfield Viscosity (measured at 350°F) of from about 750 to
about 1,200 cP;
ii) having a Peel Adhesion Failure Temperature ("PAFT") of greater than
or equal to 120°F;
iii) having a Shear Adhesion Failure Temperature ("SAFT") of greater
20 than or equal to 170°F; and
iv) exhibits 100% paper tear at 0°F.-140°F.

5. (Previously Presented) The hot melt adhesive composition of Claim 1 wherein;

A) the homogeneous ethylene/ α -olefin interpolmer is characterized by having:

- 25 i) a density of from about 0.893 to about 0.930 g/cm³;
ii) a number average molecular weight (Mn) of from about 1000 to about
6,000; and
iii) a Brookfield Viscosity (measured at 300°F) of from about 1,500 to

U.S. S.N. 10/666,648

0 about 5,000 cP; and

B) the hot melt adhesive composition is characterized by:

I) having a Brookfield Viscosity (measured at 350°F) of from about 400 to about 1,400 cP;

5 ii) having a Peel Adhesion Failure Temperature ("PAFT") of greater than or equal to 90°F;

iii) having a Shear Adhesion Failure Temperature ("SAFT") of greater than or equal to 200°F.; and

iv) exhibits 100% paper tear at 140°F.

10 6. (Previously Presented) The hot melt adhesive composition of Claim 5 wherein;

A) the homogeneous ethylene/ α -olefin interpolymer is characterized by having:

I) a density of from about 0.894 to about 0.910 g/cm³;

5,300; and

15 iii) a Brookfield Viscosity (measured at 300°F) of from about 1,600 to about 3,200 cP; and

B) the hot melt adhesive composition is characterized by:

I) having a Brookfield Viscosity (measured at 350°F) of from about 700 to about 1,200 cP;

20 ii) having a Peel Adhesion Failure Temperature ("PAFT") of greater than or equal to 90°F;

iii) having a Shear Adhesion Failure Temperature ("SAFT") of greater than or equal to 200°F.; and

25 iv) exhibits 100% paper tear at 140°F.

7. (Previously Presented) The hot melt adhesive composition of Claim 4 wherein;

A) the homogeneous ethylene/ α -olefin interpolymer is an interpolymer of ethylene and one or more C₃-C₃₀ α -olefins; and

U.S. S.N. 10/666,648

0 B) the one or more tackifiers is selected from the group consisting of aliphatic hydrocarbon resins, hydrogenated hydrocarbon resins, C₃ aliphatic or aromatic hydrocarbon resins or an aromatically modified C₃ aliphatic or aromatic hydrocarbon resins and combinations thereof; and wherein the adhesive composition is capable of binding a fibrous cellulosic article to an article selected from the group consisting of a fibrous cellulosic article,
5 wood, metal, glass, plastic, and combinations thereof.

8. (Currently Amended) The hot melt adhesive composition of Claim 4 wherein;

A) in the homogeneous ethylene/ α -olefin interpolpolymer, the α -olefin[[s]] is selected from the group consisting of C₈ (1-Octene); C₁₀ (1-Decene), C₁₂ (1-dodecene), C₁₄ (1-duodecene), C₁₄ (1-tetradecene), C₁₆ (1-hexadecene), C₁₈ (1-octadecene), C₂₀₋₂₄⁺, C₂₄₋₂₈ and C₃₀
10 and combinations thereof; and

B) the one or more tackifiers is characterized as having an acid number between 0 [[to]] and about 25.8.

15 9. (Previously Presented) The hot melt adhesive composition of Claim 5 wherein;

A) in the homogeneous ethylene/ α -olefin interpolpolymer, the α -olefin[[s]] is selected from the group consisting of C₈ (1-Octene); C₁₀ (1-Decene), C₁₂ (1-dodecene), C₁₄ (1-duodecene), C₁₄ (1-tetradecene), C₁₆ (1-hexadecene), C₁₈ (1-octadecene), C₂₀₋₂₄⁺, C₂₄₋₂₈ and C₃₀ and combinations thereof; and

20 B) the one or more tackifiers is characterized as having an acid number between 0 and about 25.8.

10. (Previously Presented) The hot melt adhesive composition of Claim 9, further comprising one or more compounds chosen from the group consisting of stabilizers, plasticizers, fillers,
25 antioxidants, preservatives, synergists, dyes, and pigments.

11. (Original) The hot melt adhesive composition of Claim 8, wherein the α -olefin is selected from the group consisting of 1-octene and propylene.

U.S. S.N. 10/666,648

Page 13 of 28

12. (Original) The hot melt adhesive composition of Claim 9, wherein the α -olefin is 1-octene.

13. (Original) The hot melt adhesive composition of Claim 8, wherein the copolymer has a molecular weight distribution (Mw /Mn) ranging from about 2.1- about 2.7.

14. (Currently Amended) The hot melt adhesive composition of Claim 9, wherein the copolymer has a molecular weight distribution (Mw /Mn) ranging ~~[[from]]~~ from about 2.1- about 16.

15. (Original) The hot melt adhesive composition of Claim 8, wherein the tackifier is present in an amount of from about 15 to about 35 percent by weight (based on the final weight of the hot melt adhesive composition).

16. (Currently Amended) A cellulosic article formed using a hot melt adhesive composition, the adhesive composition consisting essentially of;

A) from about 40 to 100 percent by weight (based on the final weight of the hot melt adhesive composition) of a homogeneous α -olefin interpolymer wherein in the hot melt adhesive composition;

1) the homogeneous ethylene/ α -olefin interpolymer is present in an amount of from about 60 to about 85 percent by weight (based on the final weight of the hot melt adhesive composition) and the homogeneous ethylene/ α -olefin interpolymer is characterized by having:

i) a density of from about 0.880 to about 0.930 g/cm³;

ii) a number average molecular weight (Mn) of from about 1,000 to about 9,000; and

iii) a Brookfield Viscosity (measured at 300°F) of from about 500 to about 7,000 cP and wherein

2) the hot melt adhesive composition is characterized by having:

U.S. S.N. 10/666,648

Page 14 of 28

- 0 i) a Brookfield Viscosity (measured at 350°F) of from about 400 to about 2,000 cp
 ii) a Peel Adhesion Failure Temperature ("PAFT") of greater than or equal to 110°F; and
 iii) a Shear Adhesion Failure Temperature ("SAFT") of greater than or
5 equal to 140°F, and

B) from about 0 to about 60 percent by weight (based on the final weight of the hot melt adhesive composition) of one or more tackifiers[[.]], wherein the homogeneous ethylene/ α -olefin interpolymer is produced by a process comprising the steps of:

10 contacting one or more olefinic monomers in a reactor in the presence of at least two catalysts, one having a reactivity ratio r_1^H and the other a reactivity ratio r_1^L ; and
 effectuating the polymerization of the olefinic monomers in the reactor to obtain an olefin polymer, wherein
15 each of r_1^H and r_1^L is from 1 to 200, and the ratio of r_1^H to r_1^L is from 0.03 to 30, and/or
 one catalyst is capable of producing a first polymer with a high molecular weight (M_{wH}) from the monomers under selected polymerization conditions, and the
 other catalyst is capable of producing a second polymer with, relative to the first
20 polymer, a low molecular weight (M_{wL}) from the same monomer under substantially the same polymerization conditions, where the ratio of M_{wH} to M_{wL} is from 1 to 20.

17. (Cancelled)

25 18. (Previously Presented) The cellulosic article of Claim 16 wherein in the hot melt adhesive composition;

A) the homogeneous ethylene/ α -olefin interpolymer is present in an amount of from

U.S. S.N. 10/666,648

Page 15 of 28

0 about 65 to about 80 percent by weight (based on the final weight of the hot melt adhesive composition) and the homogeneous ethylene/ α -olefin interpolpolymer is characterized by having:

I) a density of from about 0.890 to about 0.920 g/cm³;

ii) a number average molecular weight (Mn) of from about 1,250 to about 7,000;
and

5 iii) a Brookfield viscosity (measured at 300°F) of from about 1,000 to about 6,000 cP; and

B) the one or more tackifiers is present in an amount of from about 20 to about 35 percent by weight (based on the final weight of the hot melt adhesive composition); and wherein

10 C) the hot melt adhesive composition is characterized by:

I) having a Brookfield Viscosity (measured at 350°F) of from about 500 to about 1,400 cP;

15 ii) having a Peel Adhesion Failure Temperature ("PAFT") of greater than or equal to 115°F;

iii) having a Shear Adhesion Failure Temperature ("SAFT" of greater than or equal to 150°F; and

iv) exhibiting 100% paper tear at 140°F.

20 19. (Previously Presented) The cellulosic article of Claim 16 wherein in the hot melt adhesive composition;

A) the homogeneous ethylene/ α -olefin interpolpolymer is characterized by having:

I) a density of from about 0.893 to about 0.930 g/cm³;

25 ii) a number average molecular weight (Mn) of from about 1,000 to about 6,000; and

iii) a Brookfield Viscosity (measured at 300°F) of from about 1,500 to about 5,000 cP; and

0

B) the hot melt adhesive composition is characterized by:

i) having a Brookfield Viscosity (measured at 350°F) of from about 400 to about 1,400 cP;

ii) having a Peel Adhesion Failure Temperature ("PAFT") of greater than or equal to 90°F;

5

iii) having a Shear Adhesion Failure Temperature ("SAFT") of greater than or equal to 200°F.; and

iv) exhibits 100% paper tear at 120°F.

10

20. (Previously Presented) The cellulosic article of Claim 16 wherein in the hot melt adhesive composition;

A) the homogeneous ethylene/ α -olefin interpolymers is characterized by having:

i) a density of from about 0.894 to about 0.910 g/cm³;

5,300; and

15

iii) a Brookfield Viscosity (measured at 300°F) of from about 1,600 to about 3,200 cP; and

B) the hot melt adhesive composition is characterized by:

i) having a Brookfield Viscosity (measured at 350°F) of from about 700 to about 1,200 cP;

20

ii) having a Peel Adhesion Failure Temperature ("PAFT") of greater than or equal to 90°F;

iii) having a Shear Adhesion Failure Temperature ("SAFT") of greater than or equal to 200°F.; and

25

iv) exhibits 100% paper tear at 120°F.

21. (Previously Presented) The cellulosic article of Claim 16, wherein in the hot melt adhesive composition:

A) the homogeneous ethylene/ α -olefin interpolymers is an interpolymers of ethylene and

U.S. S.N. 10/666,648

0 one or more C₃-C₃₀ α -olefins; and

B) the one or more tackifiers is selected from the group consisting of aliphatic hydrocarbon resins, hydrogenated hydrocarbon resins, C₅ aliphatic or aromatic hydrocarbon resins or an aromatically modified C₅ aliphatic or aromatic hydrocarbon resins and combinations thereof.

5

22. (Previously Presented) The cellulosic article of Claim 19, wherein in the hot melt adhesive composition:

A) the homogeneous ethylene/ α -olefin interpolymers is an interpolymers of ethylene and one or more C₃-C₃₀ α -olefins; and

10

B) the one or more tackifiers is selected from the group consisting of aliphatic hydrocarbon resins, hydrogenated hydrocarbon resins, C₅ aliphatic or aromatic hydrocarbon resins or an aromatically modified C₅ aliphatic or aromatic hydrocarbon resins and combinations thereof.

15

23. (Currently Amended) The cellulosic article of Claim 16 wherein in the hot melt adhesive composition;

A) in the homogeneous ethylene/ α -olefin interpolymers, the α -olefin is selected from the group consisting of C₈ (1-Octene); C₁₀ (1-Decene), C₁₂ (1-dodecene), C₁₄ (1-duodecene), C₁₄ (1-tetradecene), C₁₆ (1-hexadecene), C₁₈ (1-octadecene), C₂₀₋₂₄⁺, C₂₄₋₂₈ and C₃₀ and combinations thereof; and

20

B) the one or more tackifiers is characterized as having an acid number between 0 [[to]] and about 25.8.

25

24. (Currently Amended) The cellulosic article of Claim 19 wherein in the hot melt adhesive composition;

A) in the homogeneous ethylene/ α -olefin interpolymers, the α -olefin is selected from the group consisting of C₈ (1-Octene); C₁₀ (1-Decene), C₁₂ (1-dodecene), C₁₄ (1-duodecene), C₁₄ (1-tetradecene), C₁₆ (1-hexadecene), C₁₈ (1-octadecene), C₂₀₋₂₄⁺, C₂₄₋₂₈ and C₃₀

U.S. S.N. 10/666,648

0 and combinations thereof; and

B) the one or more tackifiers is characterized as having an acid number between 0
[[to]] and about 25.8.

25. (Original) The cellulosic article of Claim 16 wherein the hot melt adhesive composition
5 further comprises one or more compounds chosen from the group consisting of stabilizers,
plasticizers, fillers, antioxidants, preservatives, synergists, dyes, and pigments.

26. (Previously Presented) The cellulosic article of Claim 16, wherein the cellulosic article is
selected from the group consisting of corrugated cardboard, kraft paper, linerboard, and paper.
10

27. (Original) The cellulosic article of Claim 19, wherein the cellulosic article is selected from
the group consisting of corrugated cardboard, kraft paper, linerboard, and paper.

28. (Cancelled)

15 29. (Cancelled)

30. (Cancelled).

31 (Withdrawn) A method of producing a polymer composition comprising admixing:

20 A) an amount of from about 60 to about 85 percent by weight (based on the final weight
of the polymer composition) of a homogeneous ethylene/ α -olefin interpolymers, wherein the
homogeneous ethylene/ α -olefin interpolymers is characterized by having:

i) a density of from about 0.880 to about 0.930 g/cm³;

ii) a number average molecular weight (Mn) of from about 1,000 to about 9,000;
and

25 iii) a Brookfield viscosity (measured at 300°F) of from about 500 to about 7,000
cP;

B) an amount of from about 0 to about 60 percent by weight (based on the final weight of

U.S. S.N. 10/666,648

Page 19 of 28

0 the polymer composition) of a tackifier; and wherein

C) the polymer composition is characterized by having:

I) a Brookfield viscosity (measured at 350°F) of from about 400 to about 2,000 cP;

5 ii) a Peel Adhesion Failure Temperature ("PAFT") of greater than or equal to 110°F; and

iii) a Shear Adhesion Failure Temperature ("SAFT") of greater than or equal to 140°F.

10 32. (Withdrawn) The method as described in Claim 31, wherein:

A) the homogeneous ethylene/ α -olefin interpolymer is characterized by having:

I) a density of from about 0.893 to about 0.930 g/cm³;

ii) a number average molecular weight (Mn) of from about 1,000 to about 6,000; and

15 iii) a Brookfield viscosity (measured at 300°F) of from about 1,500 to about 5,000 cP; and

B) wherein the polymer composition is characterized by having:

20 I) a Brookfield viscosity (measured at 350°F) of from about 400 to about 1,400 cP;

ii) a Peel Adhesion Failure Temperature ("PAFT") of greater than or equal to 90°F;

iii) a Shear Adhesion Failure Temperature ("SAFT") of greater than or equal to 200°F; and

25 iv) exhibits 100% paper tear at 140°F.

33. (New) The composition of claim 1, wherein the catalysts are single site catalysts.

- 0 34. (New) The composition of claim 1, wherein the catalysts are metallocene catalysts.
35. (New) The composition of claim 34, wherein at least one of the metallocene catalysts is a constrained geometry catalyst.
- 5 36. (New) The composition of claim 35, wherein the at least one constrained geometry catalyst is $(C_5Me_4SiMe_2N^tBu)Ti(\eta^4-1,3\text{-pentadiene})$.
- 10 37. (New) The composition of claim 1, wherein the catalysts are $(C_5Me_4SiMe_2N^tBu)Ti(\eta^4-1,3\text{-pentadiene})$ and $(1H\text{-cyclopenta}[1]\text{-phenanthrene-2-yl})dimethyl(t\text{-butylamido})silanetitanium$ dimethyl.
38. (New) The composition of claim 1, wherein the catalysts are $(C_5Me_4SiMe_2N^tBu)ZrMe_2$ and $(C_5Me_4SiMe_2N^tBu)Ti(\eta^4-1,3\text{-pentadiene})$.
- 15 39. (New) The composition of claim 1, wherein the catalysts are $\{N\text{-(1,1-dimethylethyl)-1,1-dimethyl-1-[1,2,3,4,5-}\eta\text{]-2,4-diphenyl-2,4-cyclopentadienyl-1-yl}\}silanaminato(2)\text{-KN}\}$ -dinethyl-titanium and $(C_5Me_4SiMe_2N^tBu)Ti(\eta^4-1,3\text{-pentadiene})$.
- 20 40. (New) The composition of claim 1, wherein the catalysts are $\{N\text{-(1,1-dimethylethyl)-1,1-dimethyl-1-[1,2,3,4,5-}\eta\text{]-2,4-diphenyl-2,4-cyclopentadienyl-1-yl}\}silanaminato(2)\text{-KN}\}$ -dinethyl-titanium and $(1H\text{-cyclopental}[1]\text{-phenanthrene-2-yl})dimethyl(t\text{-butylamido})silanetitanium$ dimethyl.